VERMONT

State of Vermont   Agency of Administration
Department of Information & Innovation
133 State Street, 5th Floor   [phone] 802-828-4141
Montpelier, VT 05633-0210

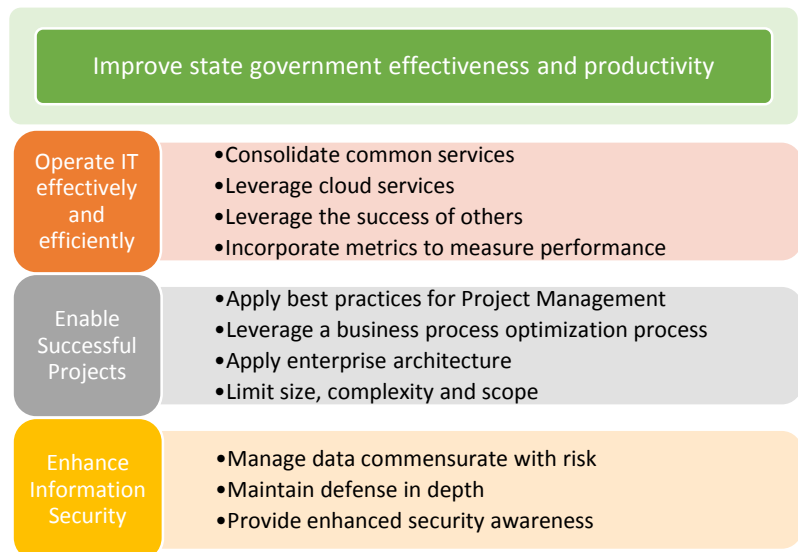## MEMORANDUM

FROM: Richard Boes, CIO & Commissioner
DATE: **January 15, 2016**
TO: Members of the General Assembly
SUBJECT: **Strategic Plan Overview & What's New**

As required by 3 VSA 2222 (a)(9), DII submits the attached five-year IT Strategic Plan to the General Assembly. The report covers the State's information technology activities and recommended financing. We also include descriptions for current and proposed activities in excess of $500,000. In addition, to provide improved transparency and context for much of the work that has led up to the plan, we include an annual report for the Department of Information & Innovation (DII).

Our plan highlights progress toward consistent and critically important goals, new metrics that improve transparency and allow us to see how we compare to other states, and a need to organize and fund IT more strategically on a statewide long-term basis.

Our IT strategy continues to be driven by our mission "*to improve state government's effectiveness and productivity through appropriate use of technology*". The three top goals and supporting strategies are shown in the graphic to the right.

New this year are some of the metrics we can use to track progress and compare many of our services with nation-wide state and local data. While this year's metrics are largely

Improve state government effectiveness and productivity

Operate IT effectively and efficiently
- Consolidate common services
- Leverage cloud services
- Leverage the success of others
- Incorporate metrics to measure performance

Enable Successful Projects
- Apply best practices for Project Management
- Leverage a business process optimization process
- Apply enterprise architecture
- Limit size, complexity and scope

Enhance Information Security
- Manage data commensurate with risk
- Maintain defense in depth
- Provide enhanced security awareness

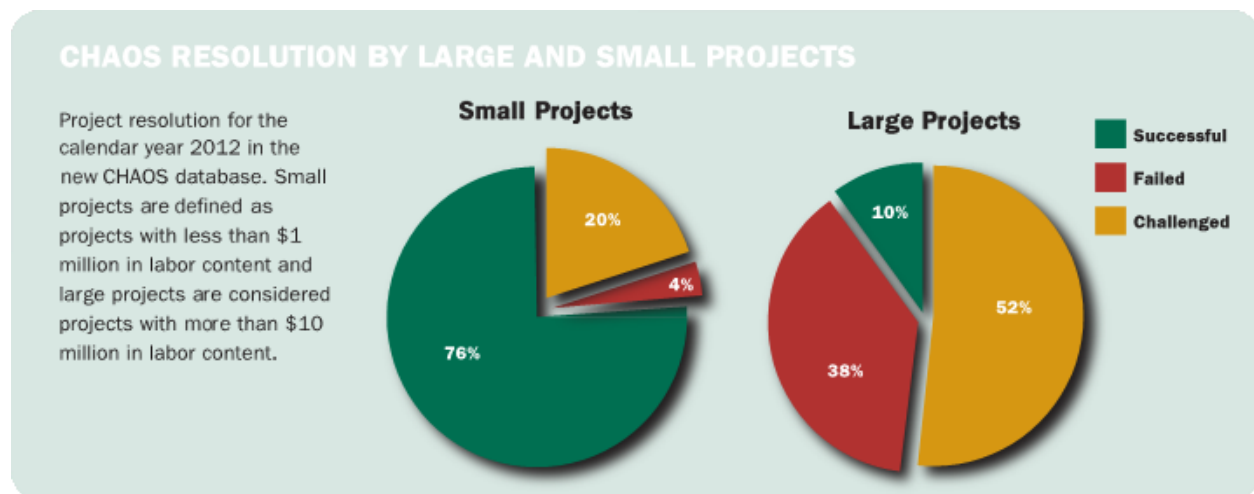restricted to data collected by DII, we have worked with the Department of Finance and

Management to enable us to track spending and metrics collected throughout the executive branch by next year.

Key issues for the plan are the need to fund IT more comprehensively and strategically, and to continue to monitor and learn what Vermont can from our sister states. It is clear from a recent survey by the National Association of State Chief Information Officers (NASCIO), that Vermont shares most of the issues ranked in the top 10 nationwide. All of the NASCIO issues are important to Vermont and we have multiple initiatives to move them forward.

| 1. Security |
| 2. Cloud Services |
| 3. Consolidation / Optimization |
| 4. Business Intelligence & Data Analytics |
| 5. Legacy Modernization |
| 6. Enterprise Vision and Roadmap for IT |
| 7. Budget and Cost Control |
| 8. Human Resources/Talent Management |
| 9. Agile and Incremental Software Delivery |
| 10. Disaster Recovery/Business Continuity |

As legislative feedback from previous reports focused heavily on projects, DII has improved the transparency of our project management processes (see http://epmo.vermont.gov). We have also developed training to bring more Agile project methods into state government – methods that focus on iterative "small step" learning rather than risky "great leap" initiatives. In general, we've limited the size, scope and complexity of projects to achieve more successful outcomes. Smaller sized projects have emerged as a best practice within the industry, and there is clear data (shown in the Standish report below) that correlates greater success with reduced size and complexity. This agrees with emerging data from states that have adopted either formal or informal limits based on project size.

CHAOS RESOLUTION BY LARGE AND SMALL PROJECTS

Project resolution for the calendar year 2012 in the new CHAOS database. Small projects are defined as projects with less than $1 million in labor content and large projects are considered projects with more than $10 million in labor content.

Small Projects: 76%, 20%, 4%

Large Projects: 10%, 52%, 38%

Successful / Failed / Challenged

Finally, security remains the #1 priority for Vermont (as it is for states nationwide). In the last few months, we've hired a new Chief Information Security Officer (CISO) and augmented the security team. We've implemented new security appliances on state networks and partnered with vendors to augment our security program. In the coming year, we will work throughout the

state to bring more security awareness to staff and ensure they have the resources and tools needed to protect state data.

The Vermont Strategic IT Plan for FY 2016-2020 is aggressive, critically important, and achievable. In recent years, we've produced measurable improvements in operating effectiveness, project management, and security. In the coming year, we will continue to move forward, and through additional transparency of IT spending, have better data to inform the decision making that helps Vermonters.

I hope you find the plan and report which follows informative and helpful.

State of Vermont
Information Technology (IT) Strategic Plan
2016-2020

Information Enabling State Government
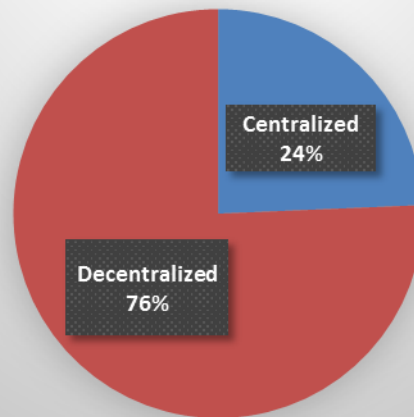
January 2016

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Purpose of this Document

The purpose of this update is to give you the information you may need to participate in any discussion about information technology in Vermont state government, whether it be budget related or citizen-service related. This report reflects what we have done, what we are doing, what we are planning and how we measure ourselves.
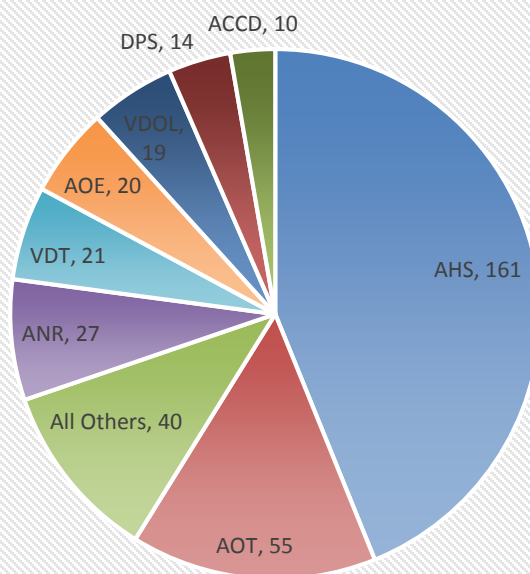
Highly Distributed IT Structure

While all states have a central IT group, their breadth of responsibility varies by state. Some states, like Maine and Michigan have a fully centralized model, while other states have various levels of "federation" (i.e. partially centralized and partially decentralized environment). In Vermont, Information technology professionals in all Branches, Agencies, and Departments of state government do their work in a "federated" environment with only 24% of the IT work force centralized (DII is the central IT group). Most common services, like email, desktop licensing and internet access are centralized, while program specific software applications, such as grants management and permitting/licensing are decentralized. The proper mix is a work in progress, but best practices have emerged that show significant economies of scale for centralization of infrastructure and common services.

Centralized IT vs Decentralized IT
(based on number of IT positions)

Centralized 24%
Decentralized 76%

Decentralized IT Positions

ACCD, 10
DPS, 14
VDOL, 19
AOE, 20
VDT, 21
ANR, 27
All Others, 40
AOT, 55
AHS, 161

In keeping with this best practice, Vermont began slowly consolidating infrastructure and common services in 2009. The consolidation of infrastructure should be complete by the end of FY 17, but the consolidation of common services is much less complete as the staff covering these services sometimes cover clearly distributed services as well.

Strategies and Solutions Common among States

A recent [survey of the 50 state CIO's](#) [1]ranks strategies and solutions of other states, in priority order. While our order is slightly different, Vermont is not unique and shares these issues. These priorities are:

1. **Security and Risk Management**: governance, budget and resource requirements, security frameworks, data protection, training and awareness, insider threats, third party security practices as outsourcing increases, determining what constitutes "due care" or "reasonable"

2. **Cloud Services**: cloud strategy, proper selection of service and deployment models, scalable and elastic IT-enabled capabilities provided "as a service" using internet technologies, governance, service management, service catalogs, platform, infrastructure, security, privacy, data ownership

3. **Consolidation/Optimization**: centralizing, consolidating services, operations, resources, infrastructure, data centers, communications and marketing "enterprise" thinking, identifying and dealing with barriers

4. **Business Intelligence and Data Analytics**: applying BI/DA within the enterprise, communicating the value, building expertise, delivering shared services, exploring big data, data analytics

5. **Legacy Modernization**: enhancing, renovating, replacing, legacy platforms and applications, business process improvement

1. Security
2. Cloud Services
3. Consolidation / Optimization
4. Business Intelligence & Data Analytics
5. Legacy Modernization
6. Enterprise Vision and Roadmap for IT
7. Budget and Cost Control
8. Human Resources/Talent Management
9. Agile and Incremental Software Delivery
10. Disaster Recovery/Business Continuity

6. **Enterprise Vision and Roadmap for IT**: vision and roadmap for IT, recognition by administration that IT is a strategic capability, integrating and influencing strategic planning and visioning with consideration of future IT innovations, aligning with Governor's policy agenda

7. **Budget and Cost Control**: managing budget reduction, strategies for savings, reducing or avoiding costs, dealing with inadequate funding and budget constraints

8. **Human Resources/Talent Management**: human capital/IT workforce, workforce reduction, attracting, developing and retaining IT personnel, retirement wave planning, succession planning, support/training, portal for workforce data and trends

9. **Agile and Incremental Software Delivery**: iterative design and incremental development of software solutions, allows for design modifications, prototyping and addition of new capabilities as part of the development process

10. **Disaster Recovery/Business Continuity**: improving disaster recovery, business continuity planning and readiness, pandemic/epidemic and IT impact, testing

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[1] http://www.nascio.org/

Strategic Funding – A Key Issue for Vermont

Lack of consistent IT strategic funding has been an issue for Vermont. The lack of strategic investment in IT has resulted in a larger than normal number of legacy systems that do not fully meet federal requirements or Vermonters' expectations.

In the absence of strategic funding, we must continue to leverage all funding sources in a manner that benefits the most programs, e.g. leverage federal funds to satisfy as many requirements as possible across government. This opportunistic method of funding does not necessarily result in a sustainable or optimal IT investment and tends to favor large projects that have a higher risk of failure.

Information technology investments[2] fall into three primary categories; resources and projects to 1) run state government, 2) support program growth, and 3) support business transformation. Part of our transparency effort includes understanding and publishing IT spending percentages for these three areas for Vermont. We know them for DII. Cross- industry averages[3] and trends are in the table below.

Cross Industry: IT Spending to Run, Grow and Transform the Business
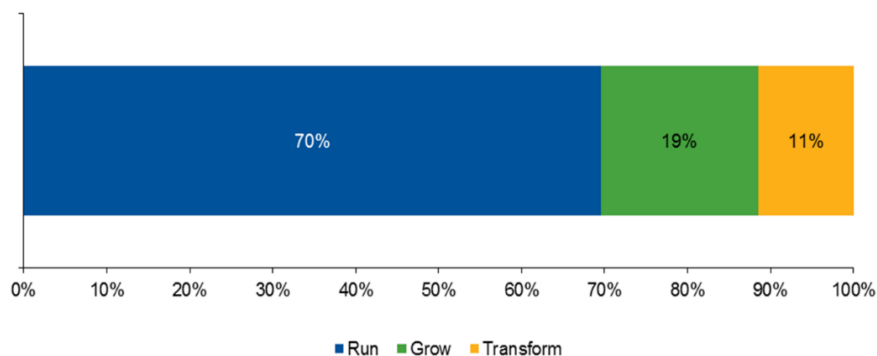
Run the business: IT resource consumed and focused on the continuing operation of the business. It includes all nondiscretionary expenses as part of the run-the-business cost. A new system that provides the same services as the old system is still considered running the business.

Grow the business: IT resource consumed and focused on developing and enhancing IT systems in support of business growth (typically organic growth). Discretionary investments are more likely to be included in the grow-the-business or transform-the-business cost. Serving more customers is growth.

Transform the business: IT resource consumed and focused on implementing technology systems that enable the state government to enact new business models. This changes the services available to the customer.

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[2] Gartner
[3] http://www.gartner.com/document/code/291338?ref=grbody&refval=3175318

State IT Spending

Transparency of technology spend, and associated metrics, are fundamental to making decisions around technology investment. Common understanding of current spend coupled with an equally common perspective on program priorities leads to faster and more appropriate decision-making. It is important to communicate fully on this topic. Our contribution to this conversation is data and guidance based on fact.

Working with the Department of Finance and Management and partner consultants, we have created new IT expense accounts for FY 2017. This work-in-progress will help staff accountants properly code technology expenses, so we will have comparable data from all Agencies and Departments in the coming years not just DII. Financial experts and technologists from all areas in state government have work to do as we transition to this updated chart of accounts. This statewide effort will get us the data. The following are metrics we will be able to track next year that will provide a standard mechanism for comparing our IT spending to our peers:

Statewide IT Spending as a Percent of Statewide Operating Expense

Annual IT spending as a percent of operating expense is another view of IT investment levels in terms of the role IT plays in overall business spending patterns.

IT Spending Per Employee Statewide

Annual IT spending per employee reflects the amount of IT support the average workforce receives.

IT Full-Time Equivalents as a Percent of all State Employees

IT FTEs as a percent of employees is a key measure of IT support and IT intensity. We have an IT classification committee working to ensure all currently marked IT positions are appropriately classified.

IT Operational Versus Capital Spending Statewide

Annual IT operational vs capital spending helps to portray the IT investment profile in a given year.

IT Spending Distribution Statewide: Hardware, Software, Personnel and Outsourcing

We know this for DII, but not statewide. The distribution of spending between hardware, software, personnel and outsourcing costs can show the dynamics of IT investments.

Objective, Goals and Strategies

In 2016 and beyond, DII will lead the change necessary to improve technology operations, increase project success rates, and strengthen information security. As we continuously learn, our priorities continue to include policy development, documentation and monitoring of best practices, publication of standards and protocols, governance, which includes participation with state agencies and departments, and gap identification. DII will lead these efforts, however, we must share this responsibility with state agencies and departments; collaboration is fundamental to enabling state government to provide the best possible service to Vermont citizens, businesses, and local governments.

Operate IT effectively and efficiency

Operate IT effectively and efficiently	•Consolidate common services •Leverage cloud services •Leverage the success of others •Incorporate metrics to measure performance

Consolidate Common Services

We are in the final stages of the Information Technology Optimization Project (ITOP) chartered in 2010 to centralize and virtualize common infrastructure and consolidate common applications such as email. We are spending about $2M less per year than we would have if we did not invest in the project. The Agency of Education, Agency of Agriculture, Agency of Administration, Agency of Human Services, Agency of Commerce and Community Development, Agency of Natural Resources, Judicial Branch, Public Safety, Liquor Control, and the Office of the Attorney General have successfully consolidated and leveraged cloud services from DII, Amazon and Microsoft. However, there are additional consolidations planed as well as the potential of consolidating additional services to reap additional benefits.

Leverage cloud services[4]

The State of Vermont has been moving IT services to the cloud for over three years. Part of the State's IT services reside in a private cloud managed by DII. Other services, like email and telecommunications, reside in a government cloud hosted by Amazon.com or Microsoft. The cloud has freed Agencies and Departments from the burden of managing servers, databases, networking, and critical operational functions. Adding additional services in the cloud is fast, offering quick turnaround for standing up new applications and services for Vermonters. DII continues to be strategically motivated to help Agencies and Departments seek out applications for their businesses that reside in the cloud.

There are three primary flavors of cloud service. They are Infrastructure, Platform and Software-*as-a-Service*. The first of these, IaaS (Infrastructure as a Service) is when the consumer does not deal with the infrastructure, instead the responsibility of the equipment is outsourced to the Service Provider. The Service Provider not only owns the equipment but will also be responsible for its running and maintenance, where the consumer will be charged on a 'pay as you use' basis.

Platform-as-a-Service (PaaS) provides the capability for consumers to have applications deployed without the burden and cost of buying and managing the hardware and software. Offering a quick time to market and services that can be provisioned as an integrated solution over the web, PaaS facilitates immediate business requirements such as application design, development and testing at a fraction of the normal cost.

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[4] http://www.zdnet.com/article/cloudy-concepts-iaas-paas-saas-maas-caas-xaas/

Software as a service (SaaS) is the ability for a consumer to use on demand software that is provided by the service provider via a web browser over the Internet. With SaaS the consumer has not only no management or control of the infrastructure such as the storage, servers, network, or operating systems, but also no control over the application's capabilities.

These cloud options have potential advantages over on premise applications including more rapid deployment of changes to business needs, elimination of on premise infrastructure such as hardware and associated maintenance and less complexity. Cloud options have also made it possible to avoid capital expense when starting something new. The traditional approach would be to buy servers, circuits to connect, physical space, and someone to administer the infrastructure. Today's options allow us to buy capacity from someone else, often through a subscription model and scale up or down as necessary; essentially avoiding large capital investments. Cloud services are not always less expensive, but we should always understand the tradeoffs as we evaluate alternatives.

Leverage the success of others
Vermont is a very special place with our own style and approach to life and government, but we are not unique from a technical perspective. We need the same approaches and often the same tools as other states as we deliver healthcare, education, infrastructure such as roads and telecommunications, permitting, licensing, and other services. We often consult with our peers to leverage solutions for common problems. This collaboration is reflected in our contracting process, our approach to information security, the application of lessons learned from common projects, training initiatives and practically everything else we do. Following is a list of some of our partners who we frequently engage to vet strategy and IT service delivery:

- New England Chief Information Officers (CIOs)
- National Association of State CIOs (NASCIO)
- Multi-State Information Sharing & Analysis Center(MSISAC) meeting of Chief Information Security Officers (CISO's)
- National Association of State Technology Directors (NASTD)
- National Association of State Purchasing Officers (NASPO)
- Gartner, Inc.

Incorporate metrics to measure performance[5]
By incorporating standard metrics into IT delivery, we can measure our performance against our peers and against competing sources for the service. For example, by measuring the cost of a service that is available from multiple sources (i.e. State provided or outsourced), we can make appropriate choices about how to source that service. In addition to sourcing, metrics can be used to measure improvements in service.

Enable Successful Projects

Apply Best Practices for Project Management

Enable Successful Projects
- Apply best practices for Project Management
- Leverage a business process optimization process
- Apply enterprise architecture
- Limit size, complexity and scope

We have established repeatable project management processes (consistent with industry standards and best practices) and we offer project

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[5] Gartner   it_key_metrics_data_2015_key_266023 :

management guidance and training through an Enterprise Project Management Office (EPMO). Project managers in the EPMO perform project oversight (as required by state statute) and provide useful tools, templates and information that contribute to project success. Our project management processes integrate and reinforce transparency, accountability and collaboration, allowing us to detect and fix problems earlier, mitigate risks appropriately, and produce realistic schedules.

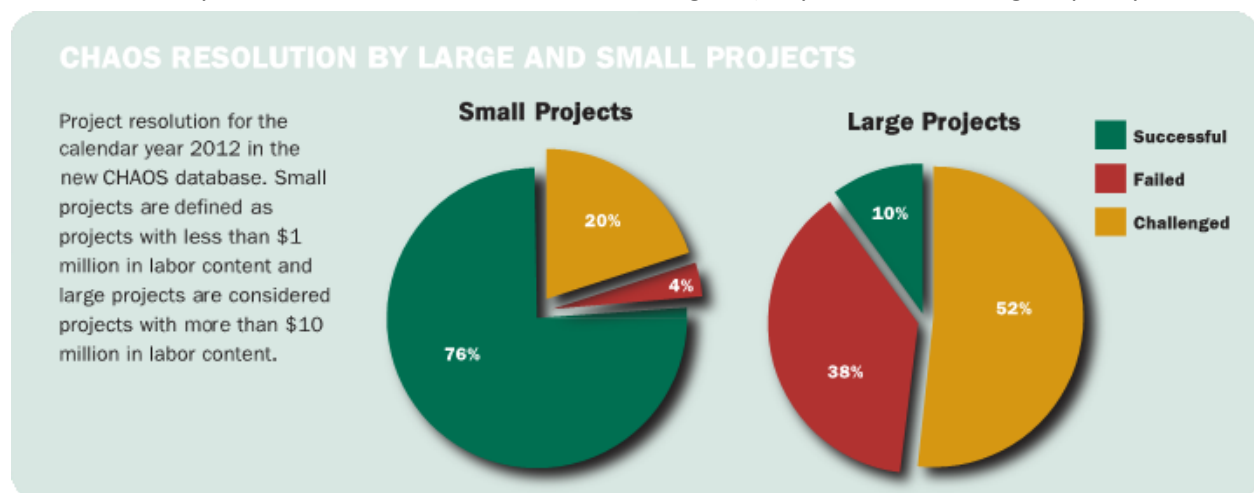### Leverage a business process optimization process

Business process optimization activities essentially minimize the resources required to get things done. When used in conjunction with automation, programs get double the benefit. It makes no sense to automate a bloated process. Agencies and departments are leaders in business process optimization. The Agency of Natural Resources (ANR) provides a standout example. ANR technologists have been active participants in ANR "Lean" events. The goal of Lean is to maximize customer value while reducing waste in the business process. Many outcomes from Lean process improvement call for the use of technology solutions to automate business processes and enable efficiencies. ANR IT has been involved to help facilitate the recommendations in the process to ensure that they are manageable and sustainable. ANR IT is currently working on a number of application development projects born out of Lean events including an application to support the Petroleum Cleanup Fund, Air Quality database integration, and Environmental Notice Bulletin.

Apply Enterprise Architecture

Enterprise Architects work closely with agency leadership and technical professionals to ensure we choose appropriate technologies to support service delivery needs. As a result, when appropriate enterprise architecture is included in a project, the technology is aligned with business goals. The primary benefit is information technology becomes a direct contributor to better business outcomes. For Vermont, this means consumers of government services have a better experience when transacting business with state programs. It also means we can accomplish more with equal or less effort, allowing us to reallocate people resources as necessary. Proper alignment of technology with business goals also reduces duplication and creates economies of scale.

Limit Size, Complexity and Scope

In a landmark 1995 study, the Standish Group established that only about 17% of IT projects could be considered "fully successful," another 52% were "challenged" (they didn't meet budget, quality or time

CHAOS RESOLUTION BY LARGE AND SMALL PROJECTS

Project resolution for the calendar year 2012 in the new CHAOS database. Small projects are defined as projects with less than $1 million in labor content and large projects are considered projects with more than $10 million in labor content.

Small Projects

76%
20%
4%

Large Projects

10%
38%
52%

Successful
Failed
Challenged

The Chaos Manifesto, the Standish Group 2013

goals) and 30% were "impaired or failed." In a recent update of that study, Standish examined IT projects in 2012 with labor costs of at least $10 million and found only 10% of them were successful[6].

Doing smaller projects does not mean a slower path to an end result. In fact, a series of smaller projects, properly executed, will likely lead to a faster, more reliable outcome. Furthermore, our strategy to limit size, scope and complexity of state IT projects is more feasible in the context of cloud based services. For example, Software-as-a-Service (SaaS) enables us to try new applications with a lower financial commitment, because there is no on-premises infrastructure commitment.[7]

Enhance Information Security

Implementing an information security strategy that combines managing data commensurate with risk, maintaining

| Enhance Information Security | •Manage data commensurate with risk
•Maintain defense in depth
•Provide enhanced security awareness |

defense in depth and providing security awareness for all employees and contractors will provide the highest level of protection for State Information Resources. Firewalls, intrusion detection systems, well trained users, policies and procedures, switched networks, strong password and good physical security are examples of some of the things that go into such a strategy.

Manage Data Commensurate with Risk

Managing information system-related security risks is a complex, multifaceted undertaking that requires the involvement of the entire organization—from senior leaders providing the strategic vision and top-level goals and objectives for the organization, to mid-level leaders planning and managing projects, to individuals on the front lines developing, implementing, and operating the systems supporting the organization's core missions and business processes. Managing data commensurate with risk can be viewed as a holistic activity that is fully integrated into every aspect of the organization.
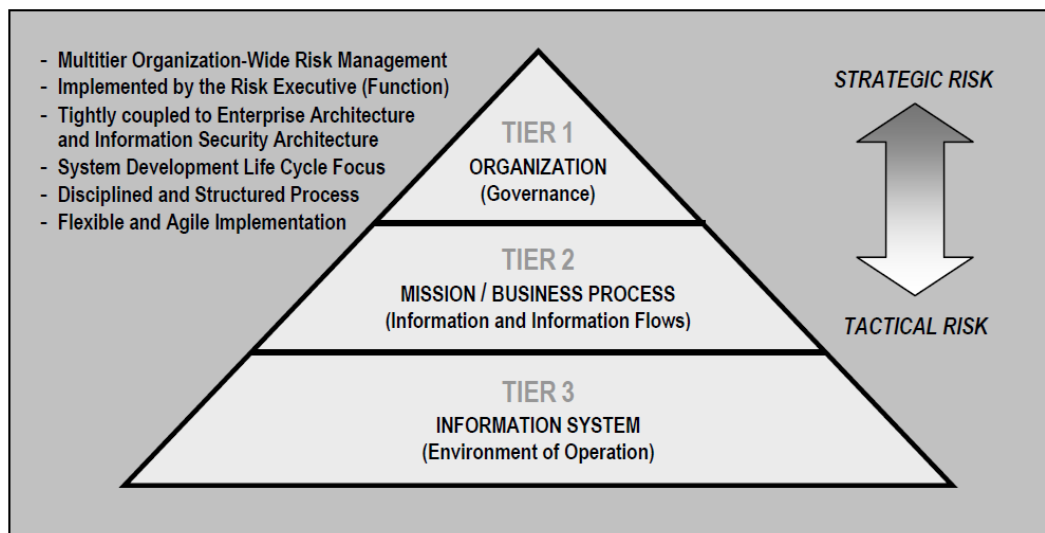
The strength of a Risk Management approach to securing State information resources can be summed up as:

- Strategic alignment of risk management decisions with missions and business functions consistent with organizational goals and objectives;
- Execution of risk management processes to frame, assess, respond to, and monitor risk to organizational operations and assets, individuals, other organizations, and the State;
- Effective and efficient allocation of risk management resources;
- Performance-based outcomes by measuring, monitoring, and reporting risk management metrics to ensure that organizational goals and objectives are achieved; and
- Delivered value by optimizing risk management investments in support of organizational objectives.

The Figure below illustrates a three-tiered approach to risk management that addresses risk-related concerns at: (i) the *organization* level; (ii) the *mission and business process* level; and (iii) the *information system* level.

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[6] http://www.informationweek.com/strategic-cio/executive-insights-and-innovation/why-do-big-it-projects-fail-so-often/d/d-id/1112087?

[7] http://www.gartner.com/document/3074817

Risk Management Framework diagram showing:
- Multitier Organization-Wide Risk Management
- Implemented by the Risk Executive (Function)
- Tightly coupled to Enterprise Architecture and Information Security Architecture
- System Development Life Cycle Focus
- Disciplined and Structured Process
- Flexible and Agile Implementation

TIER 1 ORGANIZATION (Governance)
TIER 2 MISSION / BUSINESS PROCESS (Information and Information Flows)
TIER 3 INFORMATION SYSTEM (Environment of Operation)

STRATEGIC RISK / TACTICAL RISK

This Risk Management Framework, provides a disciplined and structured process that integrates information security and risk management activities into the system development life cycle.

Maintain defense in depth

Defense in depth is the concept of protecting a computer network with a series of defensive mechanisms such that if one mechanism fails, another will already be in place to thwart an attack. Because there are so many potential attackers with such a wide variety of attack methods available, there is no single method for successfully protecting a computer network. Utilizing the strategy of defense in depth will reduce the risk of having a successful and likely very costly attack on a network.

The State of Vermont has implemented multiple layers of defense in depth: Firewalls, Network Intrusion Detection (NIDS), Network Segmentation, Strong Authentication, and Encryption. The specific technologies may change, but the strategy is sound.

Firewalls provide additional levels of defense that support the traditional routers, providing the capability to add much tighter and more complex rules for communication between the different network segments or zones. Firewalls are supplemented by Network Intrusion Detection System (IDS).

Network Intrusion Detection (IDS) will monitor network traffic to identify scans or traffic patterns that indicate an attack. A network based IDS can identify attacks that would likely otherwise go undetected, will sometimes take defensive measures such as interacting with the firewall to stop certain traffic, alert an administrator of a problem and can help identify the vulnerability that was exploited in the event of a successful attack. Information gathered by the IDS can then be used to strengthen the network by allowing us to see both the type of attack, and source. On any given week, DII sees over 10,000 attempts to gain unauthorized access to state resources.

Network Segmentation allows us to isolate network traffic based on source and destination to protect potentially sensitive information.

Strong Authentication ensures that only authorized persons get access to network resources. This can vary based on the sensitivity of the information from a strong username/password combination to multi-factor authentication with token based pin.

Encryption ensures that both data in transit, and data at rest are protected from unauthorized disclosure. Data should be protected regardless of where it resides.

Provide enhanced security awareness

"Employees can and should be the last line of defense." Security awareness training can pay off by training users on what they can do to prevent malicious activity and what to do in the event of such activity.   DII, in partnership with the Department of Human Resources, will be implementing a state agency wide security awareness program to provide state employees with the tools to recognize a potentially dangerous item such as phishing and social engineering and the knowledge to respond in the event of a problem.

Major State IT Accomplishments in 2015

Cost Reductions for VHC

In 2015, we worked with the Agency of Human Services (AHS) to reduce their cost for Vermont Health Connect (VHC) hosting by 42% and reduced security findings by 16%, saving $2.5 million annually.

State Network Redundancy

We significantly reduced the number of single points of failure in the state data network and increased uptime from 99% to a minimum of 99.9%. The overall reduction of network downtime is 6 hours per month.

Completed Technology Projects in Fiscal & Calendar Year 2015

Agency	Department	Title	Description	Completion Date
Agency of Administration	DII – ERP Technical Services	ERP PeopleTools Upgrade	The underlying ERP enabling technology (PeopleTools) for both VISION (financial management) and for VTHR (human resources and payroll) was upgraded to the highest supportable level. This allows access to new functionality and features while providing a more sustainable ERP platform.	5/17/2015
Human Services	AHS Central Office	AHS/DII ITOP	The SOV's goal is to begin to leverage Infrastructure\Virtualization technology so we can gain the most efficiency out of this technology. By establishing core infrastructure and virtualization environments with in AHS data centers, we can fully utilize central storage, failover and disaster recovery practices. Virtualization is the practice of running multiple independent operating systems and applications on a single physical computer. Instead of buying one server for every application, multiple applications can be run on a single server.	11/06/2014
Human Services	Children & Family Services	DCF Weatherization System	Implemented an automated system to track energy audits, home inspections, materials, etc. for the State's Weatherization Program.	08/18/2014
Human Services	Children & Family Services	DCF BFIS System Modifications	Enhanced the way BFIS works for the CDD staff. Improve BFIS in ways which will provide more efficient processes for the administration of childcare in Vermont.	08/18/2014
Human Services	Children & Family Services	DCF ESD EBT Economic Services Contract	The EBT Services vendor did not renew EBT services contracts therefore requiring DCF/ESD to seek an alternative EBT vendor.	11/24/2014
Human Services	Children & Family Services	DCF FSD YASI Upgrade to Casework's	Software upgrade of the Family Services software application - Youth Assessment Screening Instrument (YASI) to the newest version called Caseworks.	06/17/2015
Human Services	Children & Family Services	DCF SSMIS	Upgrade existing SSMIS system to new SSMIS	06/30/2015
Human Services	Children & Family Services	DCF Children's Integrated Services Data System	Implemented an interim data management solution to retain current business processes of data capture and reporting while preparing for eventual conversion into the MMIS Care Management solution.	09/18/2015
Human Services	Corrections	DOC Offender Management System	Replaced the technology obsolete offender system with newer technology, using the core components of AHS enterprise architecture as a foundation.	03/17/2015

Agency	Department	Title	Description	Completion Date
Human Services	Health	VDH Conference Rooms Technology Upgrade	Deployed audio visual (AV) technology to support the Health Operations Center (HOC) for continued exercises and emergency events. When activation occurs information sharing is vital with neighboring states, Canada and other departments of state government. The AV equipment, specific cabling, data and phones are integral to the response plan for the department. We need to display concurrently on multiple and strategically placed SMART boards, GIS maps, Disaster-Lan software, Situation Reports and streaming news coverage for viewing by numerous HOC ICS positions. This equipment is also vital to the department's needs of monthly Grand Rounds, conferencing, training's and press conferences.	10/01/2015
Human Services	Health Access	AHS HIE - VITL ACCESS	VITL Access is a functional product that continues being rolled out across the provider community. It Assembles patient information received from health care organizations across the state and with patient consent, giving access to this information through a single secure portal. This information is available through the statewide health information network, called the Vermont Health Information Exchange (VHIE)	05/25/2016
OTHER Executive Branch	Public Safety	DPS LPR Project	DPS License Plate Reader Project: Made the necessary upgrades to the servers and software to meet: T 23 VSA Section 1607. That statute requires any information received by LPR units be purged or deleted after 18 months.	11/06/2014
OTHER Executive Branch	Public Safety	DPS Border Patrol	Purchase and installation of cameras for U.S. / Canada border.	03/31/2015
OTHER Executive Branch	Public Safety	DPS Williston PBX Upgrade to VoIP	DPS replaced an old and failing Nortel PBX phone system in the Williston State Police office with a new Avaya VoIP phone system and integrated it with the Avaya system that was installed in the Public Safety headquarters in Waterbury last year.	04/01/2015
Transportation	Operations Division (AOT)	AOT AssetWorks (M5)	Implemented a hosted solution to track work orders, rentals, maintenance logs, etc.to be used by BGS Fleet Management, Public Safety, and AOT Central Garage.	06/17/2015
Transportation	Transportation	AOT Waterbury Area Smart Work Zone	Provides real-time travel time and delay information, and possible emergency contingency information, to the traveling public, as related to a number of planned construction projects in the Waterbury area in the coming years. This was deployed through a Smart Work Zone system consisting of cameras, queue trailers and BlueToad monitoring devices to measure queues, speeds and travel times, and a vendor-hosted system to determine real-time traffic conditions and automatically update Message Boards. There is also be a website that allows the public to view the information, and the messages being displayed on the boards via web browser.	05/12/2015
Treasurer	Treasurer	TRE VPAS: Retirement Re-Engineering Project	Implemented a stable, state of the industry, fully integrated pension administration solution, including a tightly integrated imaging and electronic workflow capability. Vermont Pension Administration Project (VPAS). Web-enabled features provide our customers greater access to services. This helps the Treasurer to deliver pensions, related benefits and services to our members while meeting a growing demand for faster simpler access to completed and accurate information.	07/30/2014

Summary

Compared to even a decade ago, many more employees, employers, and citizens of Vermont work, play, and communicate over computer networks. To support emerging needs and lifestyles with "best practice" services, the state government is continuing to focus on cost-effective IT operations, successful innovation projects, and the greatly enhanced information security that the digital world now requires.

To more clearly and objectively assess our progress we are improving the data we collect on inputs, outputs, and outcomes. This information shows we are probably spending a lower portion of state expenditures on IT as well as less on a per employee and per citizen basis. We say "probably" because many expenditures outside of DII itself have historically not been recorded and reported as IT expenses. By next year, we will have better data and clearer results.

What is already clear, however, is that we are upgrading our infrastructure and improving operations. Examples include the substantial savings recently created in healthcare hosting, our new telephone infrastructure and many other projects and operations. It is also clear that we need a more comprehensive, long-term, and strategic framework for IT budgeting. By not being aware of all IT-related revenues and expenditures – including federal and other grants as well as general revenue sources, and activities in decentralized agencies – we have too often not seen or acted on

Technology Activity	Agencies Lead and Collaborate with DII	DII Leads and collaborates with Agencies
Program specific software applications	√	
Software applications common to most users		√
Hardware infrastructure		√
Network Services (switches and circuits) infrastructure		√
Business outcome requirements	√	
Telephony service		√
Managing Projects	√	
Project Management Standards		√
IT Security		√
IT Training (both end user and technical)[8]	√	
End User Computing		√

opportunities to reduce costs and improve services. Better metrics, transparency, and funding is a key to improving this for the coming year.

Beyond better metrics and planning, we also need better project management and implementation. For this, we are upgrading our training and capabilities, especially for what is known as "agile" project management. Agile relies on projects that take smaller steps, much more quickly, with results that are much more reliably successful.

Our top priority for FY 2016 is enhanced information security. Protecting data while expanding transparency creates difficult challenges. Over the past several years, we have responded to the challenge with increased capabilities for data security and governance. Our goal is to protect data commensurate with the risks

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[8] DII provides statewide training contracts

involved. We have made real progress, but, as the threats continue to expand, we need and will build additional capability in the coming year.
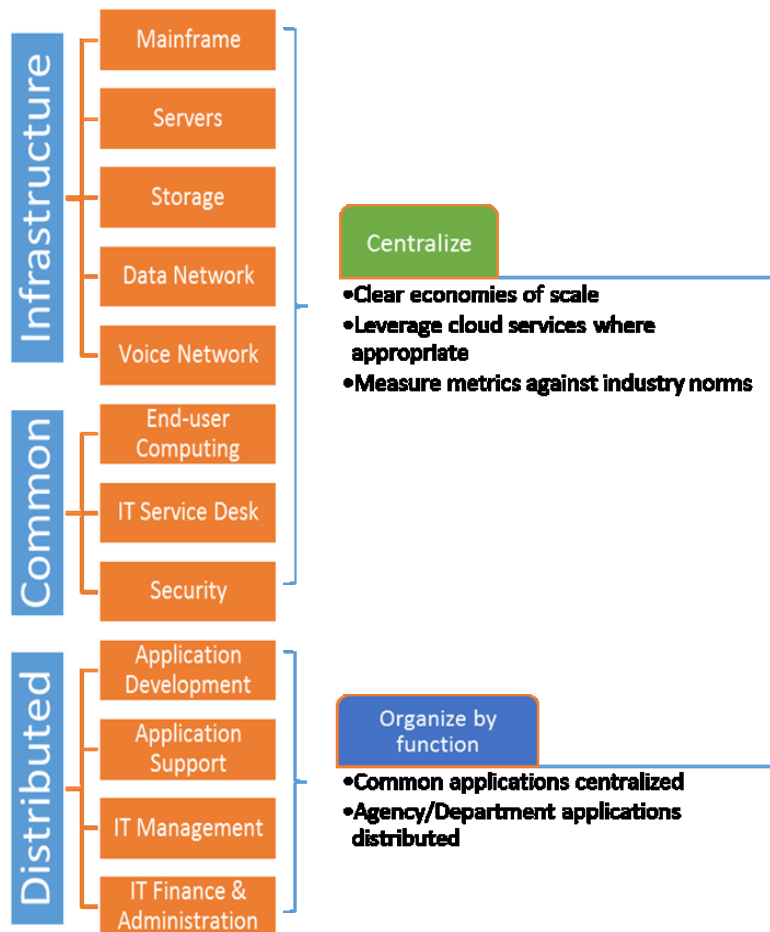
Vermont, much like other states with similar economic and social environments, and like nearly all governments everywhere, is seeking to live successfully in an increasingly digital world. There are many benefits to what is new, but also many challenges and risks. We have made good progress but still have much to do. We are optimistic that our FY 2016-2020 plans will incrementally lead to reliable new capabilities that improve our performance, despite resource constraints. However, to make the real changes needed to transform into the digital world, we will need to address IT funding and align all technology work with Vermont's strategic direction.

Appendix A – DII Annual Report

DII Overview

Shared Services

DII is a service provider to state government employees. Most of our work involves delivery of shared services. Wikipedia defines shared services as "those services provisioned by one part of an organization where that service had previously been found in more than one part of the organization. Thus the funding and resourcing of the service is shared, and the providing department effectively becomes an internal service provider." DII shared services fall in to the infrastructure and common categories reflected in the chart to the right. Our intent is to finish centralizing these services and take *full* advantage of resulting economies of scale. When it's in the best interest of the state to contract with a cloud service provider, we will manage the contract. We continuously measure our effectiveness in these areas, and the resulting metrics inform strategy, planning and decision making.

Infrastructure
- Mainframe
- Servers
- Storage
- Data Network
- Voice Network

Common
- End-user Computing
- IT Service Desk
- Security

Centralize
- Clear economies of scale
- Leverage cloud services where appropriate
- Measure metrics against industry norms

Distributed
- Application Development
- Application Support
- IT Management
- IT Finance & Administration

Organize by function
- Common applications centralized
- Agency/Department applications distributed

IT Activities Oversight

IT activities are owned by the agencies and departments who will benefit from the successful completion of the project. In order to increase the likelihood of successful projects, the DII Enterprise Project Management Office (EPMO) is required by Vermont statute to provide project management oversight on all IT Activities over $500K. These IT activities are assigned an Oversight Project Manager (OPM) from the EPMO. The OPM tracks compliance with best practice, and adds value by introducing a lessons-learned perspective. The OPM provides assistance with risk management planning, including identification and mitigation, project management education, and problem escalation. The OPM (in conjunction with the Business) performs an initial project risk evaluation to determine the appropriate level of oversight needed for a project. Another facet of this oversight of projects includes project assessments by enterprise architects. These assessments include validation of business requirements and alignment of the technical solution to business outcomes.

IT Activity Approval

Agency of Administration policy requires CIO approval of Requests for Proposals (RFPs) and contracts over $100K. An approved Business Case/Cost Analysis is a prerequisite for CIO approval on any RFP, contract or contract amendment for IT activities with lifecycle costs over $500K. The EPMO has a combined Business Case/Cost Analysis form called the IT ABC form.

IT activities with a lifecycle cost of $1,000,000 or more require an independent review (IR). The results of the IR weigh heavily in CIO approval of a project. An IR provides the state with an independent assessment of the technology project, the proposed solution, proposed vendor, and the associated lifecycle costs, risks and benefits.
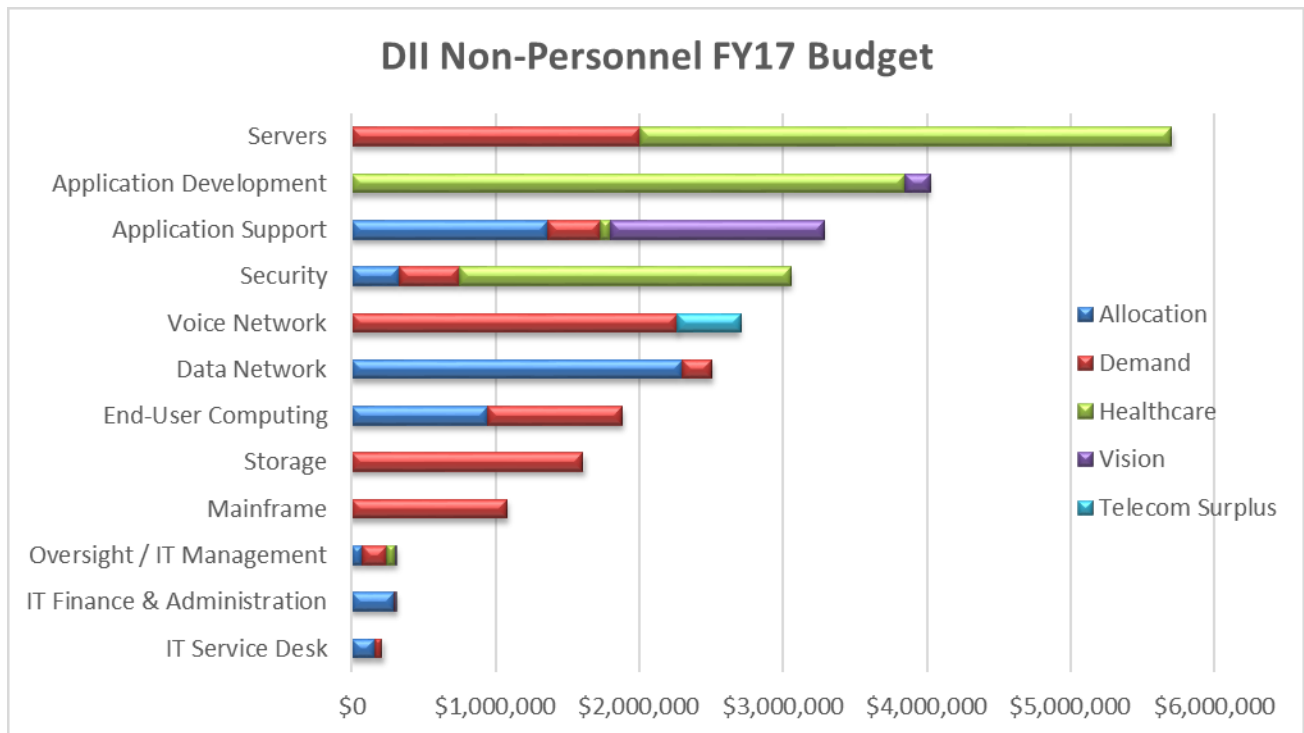
DII Budget

Truly understanding how we are spending IT dollars leads to better planning and investment. Key to understanding is knowing the definition of an IT expense and how it differs from other program expenses. The following charts reflect DII's budget for 2017 and comparisons of the 2016 and 2017 spending plans.
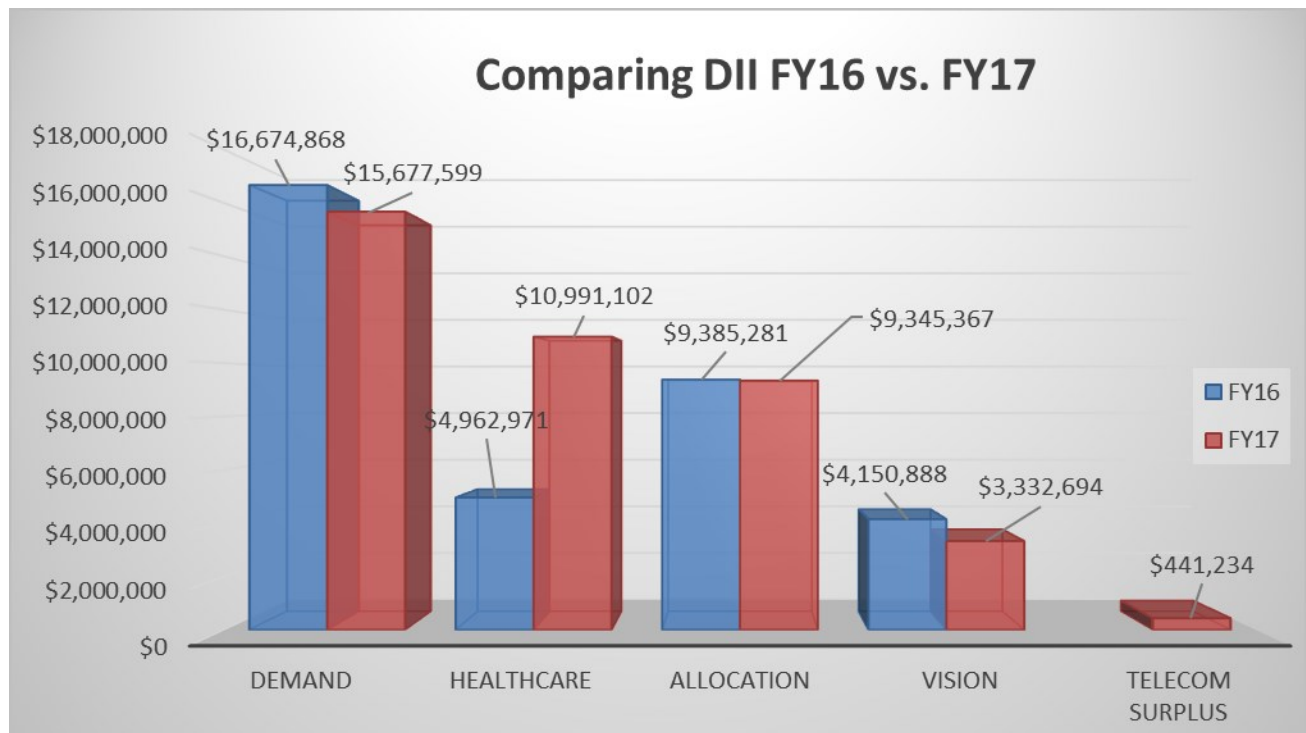

The following chart illustrates projected spending for FY17 around 12 primary spending categories and is represented by funding source. The funding sources include:

- ➤ The allocation, which refers to shared services across state government.
- ➤ Demand refers to unique service required by individual programs.
- ➤ Healthcare is funding through AHS for healthcare initiatives (also demand but broken out to illustrate magnitude).
- ➤ Vision refers to the enterprise resource planning system which includes financials and human resources, and

➤ Telecom surplus means accumulated funds used for upgrades to telephone systems. These numbers include hardware, software and overhead.

DII Non-Personnel FY17 Budget

The following chart is structured the same as the previous chart and illustrates people costs.

DII People FY17 Budget
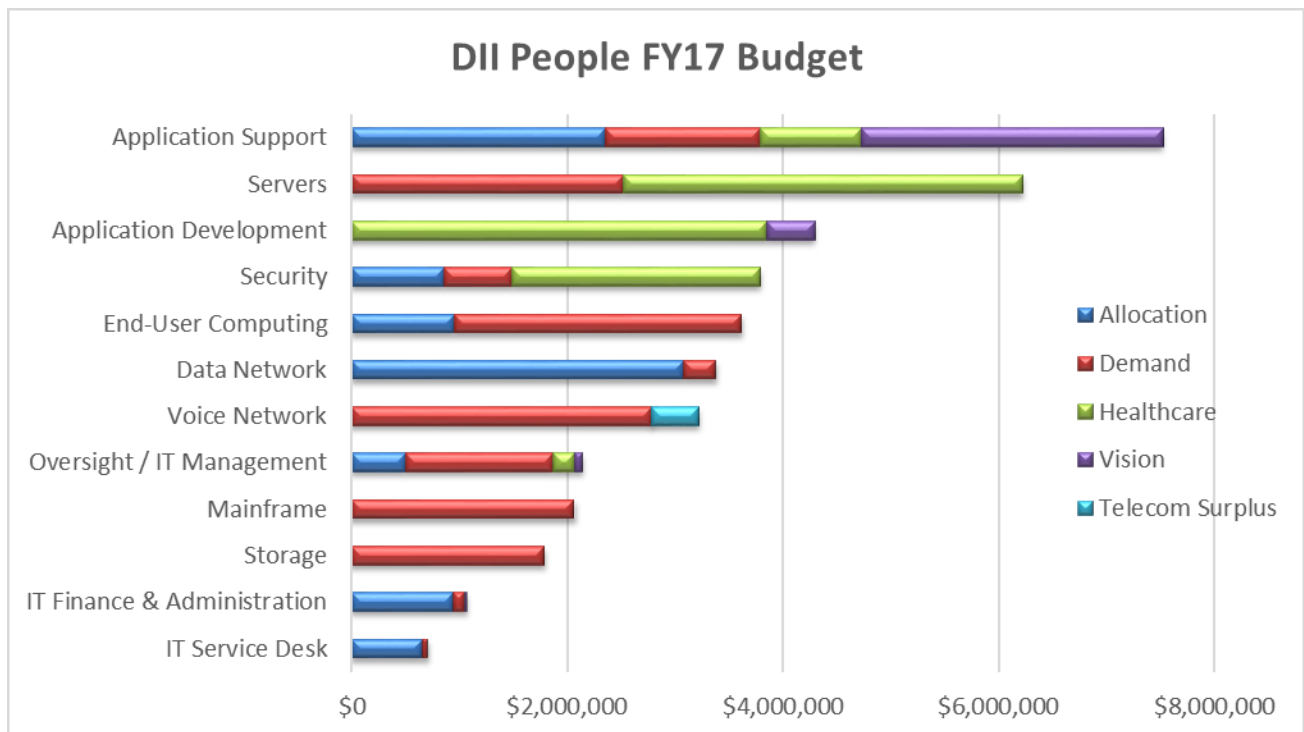
The largest change in the DII budget for FY17 is driven by a shift in healthcare funding. While this funding represents a large increase for DII, it actually represents a significant decrease in spending for the State. This is due to a shift in hosting providers that saves the State approximately $2 million annually. As part of this shift, DII now manages the hosting contract instead of AHS, so the hosting fees are represented in both

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DII's FY17 budget and AHS (since they pay DII). The security contract also shifted to DII, representing a significant up in DII's FY17 budget, but a neutral one for the State. Because of these changes, healthcare initiatives now make up the second largest component of DII's budget sources. These sources of funds are represented below.
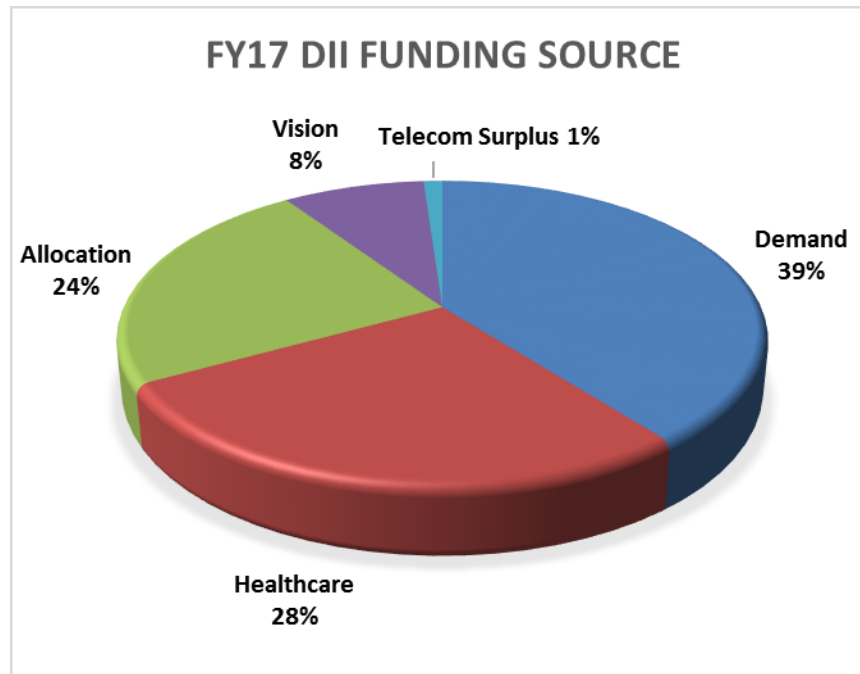

The shift in servers/hosting and in security can be seen when comparing DII's healthcare spend between FY16 and FY17.
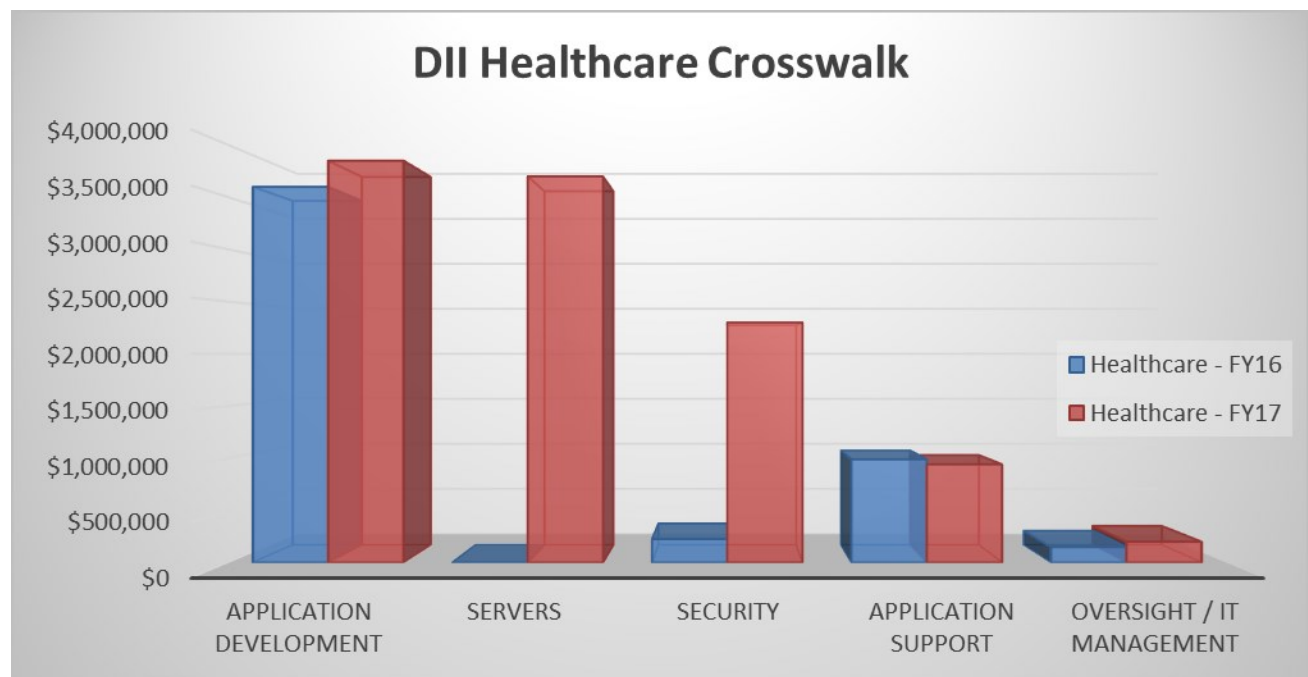
The other significant, although much smaller in magnitude, change in the DII budget is a cost shift due to additional migration to cloud services. Specifically, migrating our email and SharePoint environments from being provided on-site to being hosted in the Microsoft cloud as part of Office 365 has caused a shift from servers, storage and security to application support. The net of this change is neutral to the state in terms of funding, but represents a significant step forward in terms of capabilities and capacity. This is most clearly represented by looking at changes between FY16 and FY17 for the allocation.
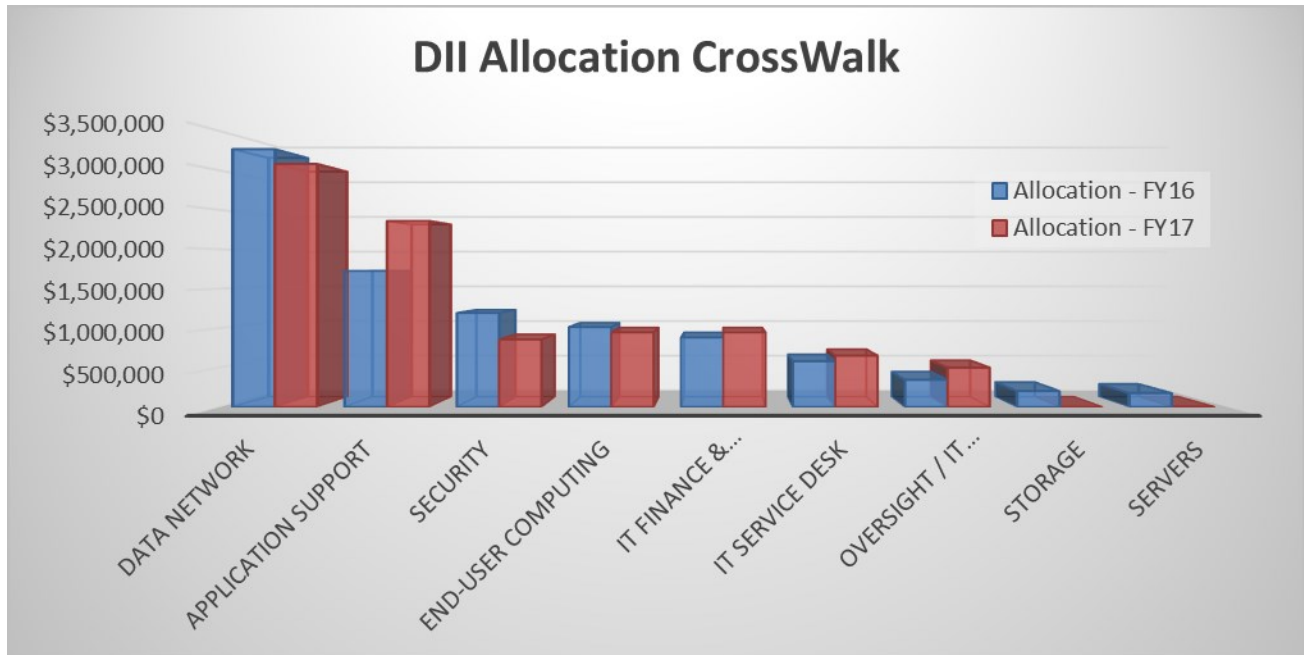
Lastly, the demand portion of DII's funding has also seen shifts. Most significant of these is the reduction in voice spending due to the implementation of our new, cloud hosted, telephone service (VOIP). Additional reductions due to the bundling of services in Microsoft's Office 365 are offset by minor increases in servers and oversight.
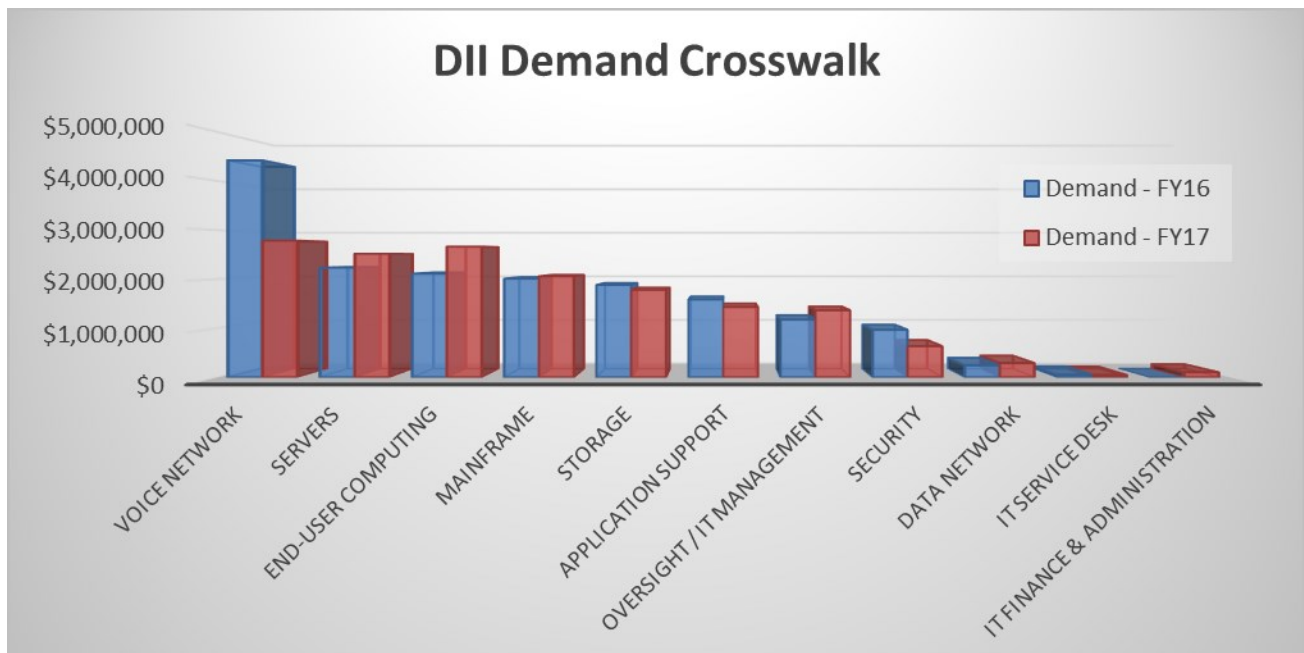
However, the dollars spent on IT are difficult to evaluate without metrics. By categorizing our spend into standard categories, as we've done for FY17, we can compare to published benchmarks in the state and local government sector published by Gartner.

DII Metrics

Metric Name	2016[9] Benchmark	DII[10]	Analysis
Annual Storage Cost Per Raw TB of capacity	$2009	$1423	We spend 29% less on storage per TB than our peers.
Number of Raw TBs Supported per Storage FTE	344	649	DII uses less staff to manage storage than our peers.
Windows Server Cost Per Operating System (OS) Instance	$5662	$3,499	DII costs are lower due to a higher amount of automation than our peers
Windows OS Instances per Windows FTE	69.3	91	DII uses less staff to manage Windows OS than our peers.
Annual IT Service Desk Cost per Agent Handled Contact	$19.07	$16.70	DII service desk employees receive more requests which reflects our "no wrong door" philosophy.
Annual Contacts Handled per IT Service Desk FTE	6023	6905	We are 13% more efficient than our peers.
IT Service Desk First Call Resolution Rate	65.4%	36%	We have not yet deployed a knowledge based repository for our service desk agents.
Annual Mainframe Cost per Installed MIPS	$3507	$9,360	We are looking to outsource our mainframe.
Average number of Installed MIPS Supported per Mainframe FTE	142	15	The metrics show that smaller organizations do not have the economies of scale. This is an additional reason to consider outsourcing.
Annual Data Network Cost per Employee	$780	$352	We support fewer ports per person than our peers.
Annual Local-Area Data Network Cost Per Active Port	$100	$86	Preliminary number requires verification.
Number of Active Ports per LAN full-time equivalent	3,352	2,267	We are smaller than our peers and have less economy of scale.
End User Devices per DII Support FTE	257	374	Through adoption of standards and limiting the use of administrative controls, we have achieved a high efficiency rate.
DII Annual End-User Computing Cost Per Personal Computing Device	$1,015	$702	We spend 31% less on end user support than our peers. This indicates additional workload taken on without additional FTE authorization.

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[9] Gartner
[10] Includes allocation and demand

As can be seen from the table above, most of DII's metrics compare very favorably with our peers and are identified in GREEN. However, there are a few notable exceptions. The two metrics for mainframe are clearly worse than our peers as we don't have the economies of scale to support a mainframe internally. For that reason, we are looking to publish an RFP to investigate outsourcing options. Also in RED is our first call resolution rate for the service desk. Since this is one of three metrics, and the other two are GREEN, we don't believe there are any structural deficiencies with the service desk, but it does show that we should spend more effort on deploying a knowledge base repository to increase this metric. We've also listed one metric in YELLOW as it is lower than the average of our peers, but well within the range for smaller states without the economies of scale some others have.

Appendix B – Million Dollar Report

2016 Million Dollar Report

Appendix C - 50 State CIO Priorities for 2016

November 10, 2015

A. Priority Strategies, Management Processes and Solutions

Top 10 Final Ranking

1. **Security and Risk Management**: governance, budget and resource requirements, security frameworks, data protection, training and awareness, insider threats, third party security practices as outsourcing increases, determining what constitutes "due care" or "reasonable"

2. **Cloud Services**: cloud strategy, proper selection of service and deployment models, scalable and elastic IT-enabled capabilities provided "as a service" using internet technologies, governance, service management, service catalogs, platform, infrastructure, security, privacy, data ownership

3. **Consolidation/Optimization**: centralizing, consolidating services, operations, resources, infrastructure, data centers, communications and marketing "enterprise" thinking, identifying and dealing with barriers

4. **Business Intelligence and Data Analytics**: applying BI/BA within the enterprise, communicating the value, building expertise, delivering shared services, exploring big data, data analytics

5. **Legacy Modernization**: enhancing, renovating, replacing, legacy platforms and applications, business process improvement

6. **Enterprise Vision and Roadmap for IT**: vision and roadmap for IT, recognition by administration that IT is a strategic capability, integrating and influencing strategic planning and visioning with consideration of future IT innovations, aligning with Governor's policy agenda

7. **Budget and Cost Control**: managing budget reduction, strategies for savings, reducing or avoiding costs, dealing with inadequate funding and budget constraints

8. **Human Resources/Talent Management**: human capital/IT workforce, workforce reduction, attracting, developing and retaining IT personnel, retirement wave planning, succession planning, support/training, portal for workforce data and trends

9. **Agile and Incremental Software Delivery**: iterative design and incremental development of software solutions, allows for design modifications, prototyping and addition of new capabilities as part of the development process

10. **Disaster Recovery/Business Continuity**: improving disaster recovery, business continuity planning and readiness, pandemic/epidemic and IT impact, testing

201 East Main Street, Suite 1405 Lexington, KY 40507 859.514.9153 T: @NASCIO info@NASCIO.org

B. Priority Technologies, Applications and Tools

Top 10 Final Ranking

1. **Security Enhancement Tools**: continuous diagnostic monitoring (CDM), digital forensics

2. **Cloud Solutions**: software as a service

3. **Legacy Application Modernization/Renovation**

4. **Data Management**: master client index/master data management, information exchanges (e.g., health, justice, transportation, environmental)

5. **Business Intelligence (BI), Business Analytics (BA)**: applications, big data, data analytics

6. **Identity and Access Management**: technologies and solutions

7. **Mobile Workforce**: technologies and solutions

8. **Virtualization**: servers, desktop, storage, applications, data center

9. **Networking**: voice and data communications, unified

10. **Document/Content/Records/E-mail Management**

Appendix D - $500K IT activities

Active IT Project (as reported to DII)	Lifecycle years	Total Lifecycle Costs
Health Access	Sub-total	**$708,687,500**
AHS HIE - Blueprint Clinical Registry	3	$4,095,657
AHS HIE - VITL Development	6	$6,183,539
AHS Vermont Health Connect (VHC)	5	$418,993,873
DVHA MMIS - Care Management	7	$27,627,857
DVHA MMIS - Core Operations	10	$221,257,000
DVHA MMIS - PBM	6	$21,607,534
DVHA Ops MMIS changes ICD10	5	$8,922,040
Children & Family Services	Sub-total	**$371,925,850**
AHS Integrated Eligibility (IE)	20	$362,748,827
DCF FSD Results Oriented Management (ROM) Reporting Tool	10	$831,048
DCF Fuel Payment Re-Structuring	20	$8,345,975
Finance & Management (AOA)	Sub-total	**$78,364,830**
AOA ERP Expansion	20	$78,364,830
Taxes	Sub-total	**$43,701,000**
TAX eCurrent Use	7	$723,276
TAX ITS Solution	10	$42,977,724
Labor Department	Sub-total	**$31,060,729**
DOL Worker Compensation Modernization	20	$1,596,530
VDOL Unemployment Insurance Modernization Consortium	20	$29,464,199
Information & Innovation	Sub-total	**$16,373,142**
DII Adobe Product Implementation	3	$950,897
DII Office 365	4	$9,430,160
DII VoIP Implementation	7	$5,992,084
Aging & Independent Living	Sub-total	**$15,677,889**
DAIL DVR/ DBVI Case Management System	10	$15,677,889
Secretary of State	Sub-total	**$15,059,664**
SOS Corporations Registration	5	$910,080
SOS Elections Administration	10	$3,334,409
SoS Information Security Testing & Consulting	20	$507,593
SOS Next Generation Licensing Platform	10	$10,307,582
Education	Sub-total	**$12,599,116**
AOE VADR (Longitudinal Data System (SLDS))	6	$8,888,766
AOE Vermont Child Nutrition System Modernization Project	20	$3,710,350
Enhanced 911 Board	Sub-total	**$11,664,260**
e911 Replacement	5	$11,664,260
Health	Sub-total	**$8,788,315**
VDH Food and Lodging Licensing and Permitting System	5	$600,000
VDH Starlims Lab Info System (Deployment and Automation)	10	$2,683,921
VDH VPMS Online Data System	5	$750,750
VDH Website Upgrade	5	$529,750

Active IT Project (as reported to DII)	Lifecycle years	Total Lifecycle Costs
VDH Women Infant Children (WIC) System Replacement/EBT Implementation	5	$4,223,894
Department of Motor Vehicles	**Sub-total**	**$6,630,000**
DMV Cashiering System Replacement	5	$3,850,000
DMV Credentialing Issuing Services Replacement	5	$1,000,000
DMV Electronic Oversize Permitting System	5	$1,780,000
Liquor Control Department	**Sub-total**	**$4,287,966**
DLC Retail and POS Project - Phase 2 (Implementation)	5	$4,287,966
Public Safety	**Sub-total**	**$3,767,451**
DPS e-Ticket project	10	$3,767,451
Central Garage (AOT)	**Sub-total**	**$3,014,766**
AOT Advanced Transportation Mgmt. System (NH, VT & ME)/ 511 Phone System/CARS	20	$2,236,988
AOT Automatic Vehicle Location System	5	$777,778
Mental Health	**Sub-total**	**$3,000,000**
DMH Vermont State Hospital Electronic Health Record (EHR)	7	$3,000,000
Policy & Planning (AOT)	**Sub-total**	**$2,915,015**
AOT dTIMS	5	$632,358
AOT VTrans Crash Reporting Tool	5	$2,282,657
Public Service Department	**Sub-total**	**$2,334,768**
PSB Case Management (Sustain)	7	$2,334,768
Corrections	**Sub-total**	**$1,975,206**
DOC Cameras and Systems	10	$724,676
DOC Inmate Healthcare Services Project	5	$1,250,530
Operations Division (AOT)	**Sub-total**	**$1,912,025**
AOT Business Process Management System (BPMS)	20	$1,912,025
Buildings & General Services	**Sub-total**	**$1,772,524**
AOA Worker's Comp & Liability System	5	$1,772,524
Natural Resources	**Sub-total**	**$1,100,000**
ANR DEC Enterprise Content Management System	5	$1,100,000
Defender General	**Sub-total**	**$891,566**
ODG Public Defense Case Management System	7	$891,566
Economic Housing & Community Development	**Sub-total**	**$613,900**
Agate Intelligrants IG15	10	$613,900
AHS Central Office	**Sub-total**	**$587,364**
AHS Learning Management System	5	$587,364
State's Attorney's & Sheriffs	**Sub-total**	**$578,740**
SAS Criminal Case Management System	10	$578,740
Grand Total	**Total**	**$1,349,283,586**